MULTIMEDIA UNIVERSITY®

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 2, 2022/2023 (2220)

HPC2011 – INTRODUCTORY COURSE IN PHARMACOLOGY

(All section / Groups)

7 JULY 2023
9.00 a.m. – 11.00 a.m
(2 Hours)

INSTRUCTIONS TO STUDENTS

1. This Question paper consists of **5 pages** with **4 Questions** only.
2. Attempt **ALL FOUR** questions. All questions carry equal marks and the distribution of the marks for each question is given.
3. Please print all your answers in the Answer Booklet provided.
4. You can use calculator in the examination.

Answer ALL questions [40 marks, 10 marks each]

QUESTION 1

A. What is an orphan drug? Why are many pharmaceutical companies reluctant to develop orphan drugs? [1 mark]

B. Describe briefly the importance of drug chirality in drug-receptor interaction. [1 mark]

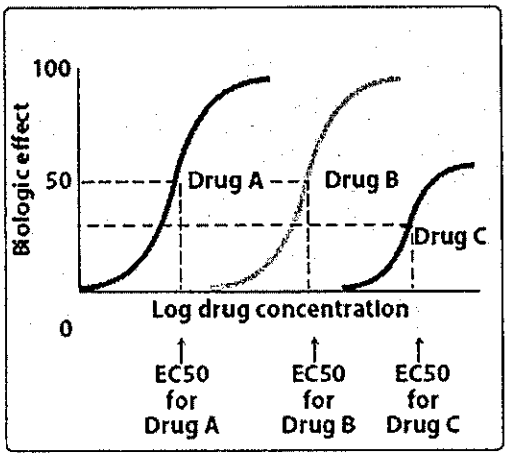
C. A mutation of a membrane receptor has been implicated in a neurodegenerative disease. This mutation causes an increase in basal activity of signaling pathway even in the absence of ligand binding. Suggest the type of agonist or antagonist, which may be used as a candidate drug to regulate the activity of the receptor. Explain your answer briefly. [1 mark]

D. What is an undruggable protein? [1 mark]

E. Ion channels are one of the major drug targets. Give TWO possible mechanisms how these drugs may affect the functions of the ion channels. [2 marks]

F. List FOUR major types of receptors for drug targets and their time scale of the cellular response. [2 marks]

G. Three novel drugs to treat Alzheimer's disease have undergone phase I trials. A graph of the biologic effect versus log drug concentration is plotted in the following graph. Compare the efficacy and potency of drug A, B and C. [2 marks]



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QUESTION 2

A. The maintenance of intracellular Ca^{2+} homeostasis is crucial for proper cellular functions. What are the 4 main routes for the entry of Ca^{2+} into the cells across plasma membrane? [2 marks]

B. List ONE approach to increase cellular excitability. [1 mark]

C. Drugs that inhibit apoptosis has been considered as a potential novel approach for the treatment of degenerative disorders. However, it has been suggested that the anti-apoptosis pathway should not be overly stimulated. Explain this rationale. [1 mark]

D. How does active immunotherapy work for cancer treatment? [1 mark]

E. Explain why blood brain barrier poses a great challenge to the drug development for brain disease. [2 marks]

F. You receive a call from a frantic mother whose 3-year old son ate a handful of her amitriptyline (a weak acid). You instruct the mother to take her son to the emergency department where he is given bicarbonate (in addition to other measures). What is the most likely explanation for bicarbonate administration in this case? [1 mark]

G. Low bioavailability is one of the issues for orally administered drugs. Give TWO possible reasons for low bioavailability. [2 marks]

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QUESTION 3

A. Give ONE information you can get from elimination half-life ($t_{1/2}$)? [1 mark]

B. Briefly describe why, in comparison to the one-compartment model, the two-compartment model provides a more accurate picture of the pharmacokinetic behavior. [2 marks]

C. What happens when acetylcholine binds to nicotinic receptors on a neuron in the central nervous system (CNS)? [1 mark]

D. Glaucoma has been treated with eye drops containing a muscarinic receptor agonist. How does it work? [1 mark]

E. Briefly describe the mechanisms through which local anesthetics work. [1 mark]

F. What role does melatonin play in biology? What outcome does the melatonin agonist produce? [2 marks]

G. How does plant derivatives, such as vincristine kill cancerous tumors? [1 mark]

H. How do protein kinase inhibitors work as anticancer drugs? [1 mark]

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QUESTION 4

A. Claudia has a bad flu and the doctor prescribes her some amoxicillin antibiotics. Does it make sense? Why? [1 mark]

B. Describe briefly TWO strategies for the hypertension treatment. List ONE drug class for each strategy. [2 marks]

C. Explain briefly how thiazides and thiazide-like drugs increase the volume of the urine. [1 mark]

D. Describe briefly TWO pharmacological approaches to tackle obesity. [2 marks]

E. What happens when a woman has too much androgen? [0.5 mark]

F. Why is it difficult to predict the side effects of a drug? [1 mark]

G. What do clinical trials' phases I and IV have as their goals? [2 marks]

H. What role do model organisms play in the development of drugs? [0.5 mark]

End of paper